

THE MENTOR

"A Wise and Faithful Guide and Friend"

VOL. I

No. 29

GREAT AMERICAN INVENTORS

ELI WHITNEY

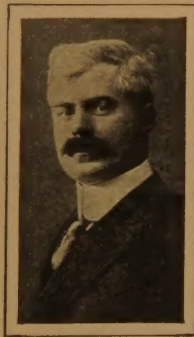
1765-1825

ROBERT FULTON

1765-1815

ELIAS HOWE

1819-1867



S. F. B. MORSE

1791-1872

ALEX. GRAHAM BELL

1847-

THOMAS ALVA EDISON

1847-

By H. ADDINGTON BRUCE

ANYONE who reads the history of the United States must be impressed with the supremely important part played by the inventor in the evolution of the nation. The explorer and pioneer, the statesman, diplomat, and soldier,—all these have contributed, and contributed notably, to the upbuilding of the mighty republic of today. But it is beyond dispute that in the long run their efforts would have counted for comparatively little had it not been for the genius of those who have bent their energies to the devising of means for the development of the country's marvelously rich resources, and have still further added to the national wealth by the creation of unsuspected channels for the profitable employment of human enterprise and labor.

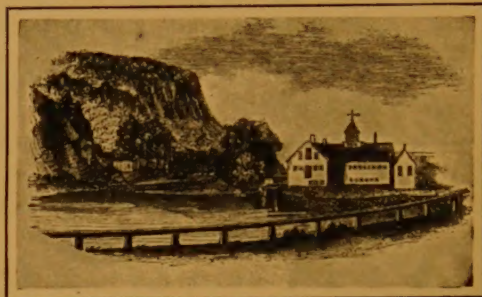
It was in the humble workshops of men like Whitney, Fitch, and Fulton that, almost as soon as the independence of the United States had been won by the sword, the foundations were laid for its rise to the standing of a world power. Every invention these men made meant

a gain in the nation's strength, and a wider opening of the door of opportunity to all native-born Americans, and to the constantly increasing host of newcomers from abroad. The American inventors have not simply astonished mankind; they have enhanced the prestige, power, and prosperity of their country.

THE COTTON GIN

Take, for example, the results that have flowed from a single invention, that of the Whitney cotton gin. When the young Yankee schoolmaster and law student, Eli Whitney, was graduated from Yale and settled in Georgia in 1792, the production of cotton in the Southern States was insignificant. At that time, indeed, cotton was grown by the Southerners chiefly for decorative effect in gardens, because of its handsome flowers. Its cultivation for commercial purposes was virtually out of the question, owing to the fact that no means were available for economically separating the lint from the seed. This had to be done by hand, and since it took ten hours for a quick worker to separate one pound of lint from its three pounds of seed no adequate returns could be had.

What was needed, as his southern friends pointed out to Whitney, was the invention of some apparatus for performing the work of separation cleanly and quickly. The problem was one that appealed to him with peculiar force. Even as a boy in Massachusetts he had been fond of tinkering with mechanical appliances. At the early age of twelve he had made a violin of fairly good tone; a year later he was making excellent knives; and before he was fifteen he was recognized as the best mechanic in his native town of Westborough. It was therefore with real enthusiasm that he set up a workshop in the basement of his Georgia home, and varied his law studies by experimenting in the manufacture of a cotton gin. Within a few months he



WHITNEY'S ARMORY

In 1798 the inventor of the cotton gin began the manufacture of firearms near New Haven, Connecticut.



BIRTHPLACE OF WHITNEY

In this house in Westborough, Massachusetts, Eli Whitney was born on December 8, 1765.

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had successfully completed his self-imposed task by the creation of a machine equipped with hundreds of tiny metal fingers, each of which did more work in quicker time than the human hand could possibly do.

That same year (1793) fully five million pounds of cotton were harvested in the United States, the product of a planting stimulated solely by faith in the Whitney gin. By the year of Whitney's death (1825) cotton was indisputably king in the commercial life of the nation, the value of the cotton exports for that year being more than \$36,000,000, as against a valuation of barely



THE FULTON HOMESTEAD

The inventor purchased this farm in Washington County, Pennsylvania, when he was but twenty-one years of age. Here he left his mother when he went to England to study art.

\$30,000,000 for all other American exports. The eventual abolition of slavery served only to accentuate the stupendous importance of the cotton gin. Under free labor the production of cotton has steadily risen, until nowadays it annually runs into the billions of pounds, with a valuation of many hundreds of millions of dollars, and affords employment not only to an enormous army of cultivators, but to a still greater army of workers in factory, office, and store.

Even of much greater importance have been the results of the labors of another illustrious American inventor, Robert Fulton. Born in Lancaster



ROBERT FULTON

Fulton was tall, and his face showed great intelligence. He was refined, and possessed grace and elegance of manner.

County, Pennsylvania, in November, 1765, Fulton, by reason of the astonishing number and variety of his inventions, may well be called the Edison of his time.

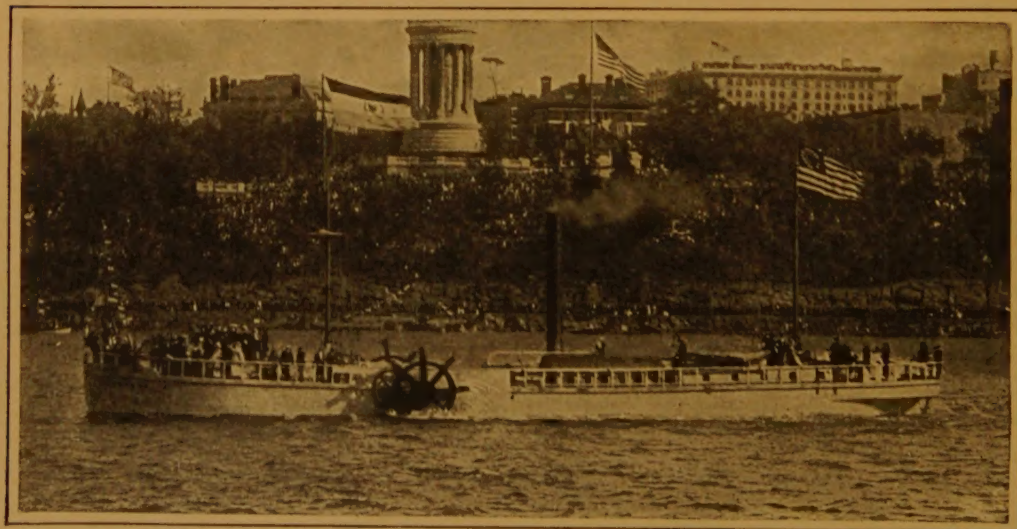
ROBERT FULTON

Similar to all truly great inventors, he was a man of broad vision and keen imagination. What he was most interested in was not immediate consequences, but ultimate effects, and in working on the complicated mechanical problems with which his mind was incessantly occupied he kept steadily in view their significance to society as a whole. Thus, one of his most ingenious creations—the famous Fulton torpedo, crude forerunner of the deadly submarine missiles of today—was inspired by an ardent desire to produce something that would make war so terrible as to impel



FULTON'S FIRST EXPERIMENT WITH PADDLE WHEELS

In the summer of 1779 Fulton first tried the method of propelling a boat by means of paddle wheels on Conestoga Creek in eastern Pennsylvania.



MODEL OF ROBERT FULTON'S FIRST STEAMBOAT, THE CLERMONT

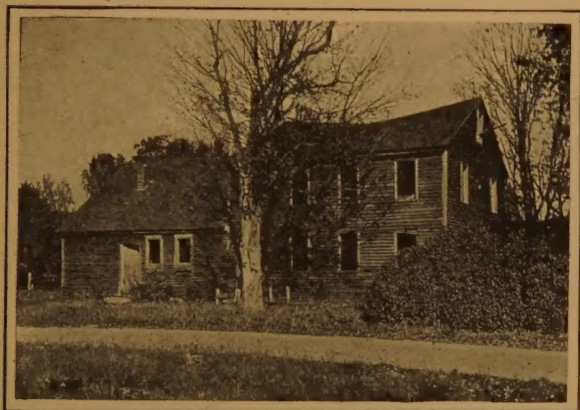
Constructed for the Hudson-Fulton celebration at New York in the fall of 1909.

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mankind to universal peace. And similarly it was with an eye to increasing the welfare and happiness of society that he went to work on the invention with which his name will always be linked,—the steamboat.

He was not the first to whom the idea had occurred of applying the steam engine to purposes of water transportation. Already the Pennsylvanian, William Henry, the Connecticut mechanic, John Fitch, the New Jersey inventor. John Stevens, and the Scotsman, William Symington, had

demonstrated more or less successfully the possibility of using steam as a motive power on the water; but it was left to Fulton to establish definitely the value of the steamboat as



BIRTHPLACE OF ELIAS HOWE

Amid these humble surroundings the inventor of the sewing machine was born at Spencer, Massachusetts, in 1819.

a medium for passenger and freight traffic. This he did with his historic Clermont, built at New York in 1807, partly with funds provided by Chancellor Livingston and partly by loans from reluctant and skeptical friends.

The general impression was that Fulton had undertaken a hopeless and visionary task. "As I had occasion," he himself has related, "daily to pass to and from the shipyard while my boat was in progress, I often loitered unknown near idle groups of strangers, gathering in little circles, and heard various inquiries as to the object of this new vehicle. The language was uniformly that of scorn, sneer, or ridicule. The loud laugh often rose at my expense; the dry jest; the wise calculation of losses and expenditures; the dull but endless repetition of 'Fulton's Folly.'"



BEFORE THE WAR

A sewing machine of 1851.



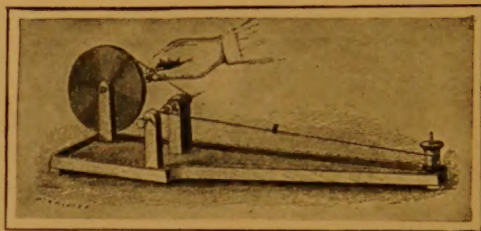
A SEWING MACHINE OF 1860

"It has stitched many hundred miles of seam, and is still in good working order."

with the wind again ahead, returned to New York at about the same speed. Compared with the steaming powers of the modern ocean leviathan, this was a sorry enough showing; but, with the continued success of the *Clermont* and her sister boats, the *Raritan* and the *Car of Neptune*,—which together constituted the world's first regular line of steamboats,—it was sufficient to prove for all time that man had made

INVENTOR OF THE SEWING MACHINE

Very different, but also of great value, was the service rendered by Elias Howe of sewing machine fame. There are two stories as to the genesis of this wonderful labor-saving device. One is that it was suggested to Howe by the chance remark of a visitor to the Boston machine shop in which he was employed. The other and more romantic story



THE FIRST BOBBIN WINDER

As everybody knows, the *Clermont* did not sink or otherwise come to grief when she started up the Hudson, August 11, 1807, for her maiden voyage to Albany. On the contrary, she made the journey, against the wind, at an average rate of nearly five miles an hour; and,



BIRTHPLACE OF S. F. B. MORSE

The inventor of the telegraph was born at the foot of Breed's Hill, Charlestown, Massachusetts.

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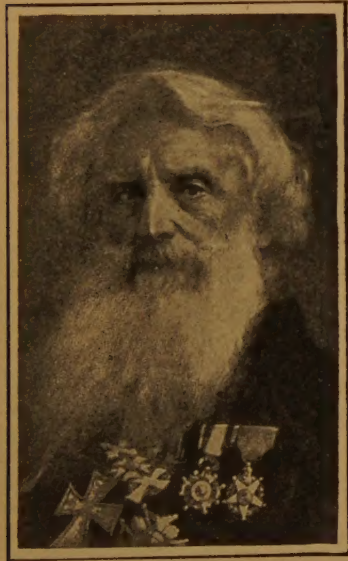
is that the idea of a machine for sewing garments originated from a desire on Howe's part to lighten the labor of his wife, who, when he was ill and out of work, was obliged to take in sewing and toil far into the night.

Whichever version is correct, it is certain that in 1843 (Howe was then only twenty-four years old) he set to work in the garret of his father's home in Cambridge, and about a year later gave to the world a sewing machine that embodied the principal features of the most up-to-date models of

the present day. For long, however, the world was reluctant to accept this splendid invention. The tailors of Boston, to whom he first offered it, refused to adopt

it, on the ground that it would ruin their business; and later, in New York, there were anti-sewing machine demonstrations, fomented by labor leaders, who failed to realize that in the end labor-saving devices of any real merit were always certain to increase, not decrease, the demand and opportunities for the workingman and workingwoman.

In the case of the sewing machine the truth of this has long since been demonstrated. Not



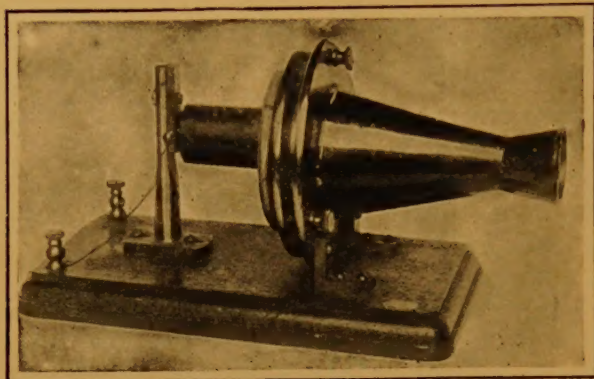
SAMUEL F. B. MORSE

only has it become a familiar household adjunct, freeing millions of women from the slavery of the needle, and thus most effectively answering the piteous plea of Hood's "Song of the Shirt," but it has also brought about a marvelous expansion of the clothing industry. It has in fact created an entirely new and most important branch of that industry,—the ready-made clothing business,—giving employment to hundreds of thousands of people, and providing well patterned and well finished garments at prices undreamed of in other days. Surely Howe, no less than Fulton and Whitney, deserves to be regarded



THE NEW YORK HOME OF
S. F. B. MORSE

This house was located on West Twenty-second Street near Fifth Avenue.



**THE FIRST
TELEPHONE**

as a benefactor of humanity.

So, too, with Samuel F. B.

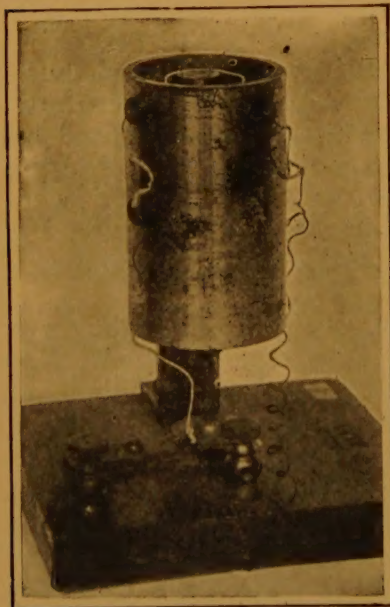
Morse, and Alexander Graham Bell, the one the father of the electric telegraph, the other the inventor of the telephone. If anybody had told Samuel Morse in 1811, when as a youth of twenty he sailed from New York to

Liverpool to study paint-

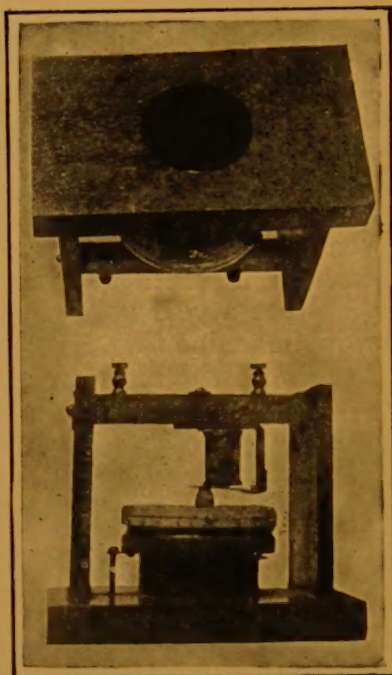
ing under Benjamin West, that he would be known to posterity as an inventor rather than as an artist, he would have laughed the prophecy to scorn. But, as has happened to other gifted men, circumstances conspired to turn and fix the thoughts of this brilliant son of New England on problems unconnected with the routine of his daily life, yet appealing to him with such force as to change the whole course of his career.

TELEGRAPH AND TELEPHONE

With Morse the turning point was reached in 1827 when, some years after his return from England, he attended a course of lectures in New York on the subject of electromagnetism. What he then heard fired his imagination, and led him, during a second visit abroad, to study more closely



**THE FIRST TELEGRAPH
INSTRUMENT**



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the nature of electricity. He specially became interested in the possibility of utilizing this great natural force as a medium for long-distance communication, and when homeward bound, in the autumn of 1832, applied himself to this one problem to such good purpose that before landing in New York he was able to show to his fellow passengers plans of the instrument that was to immortalize his name.

It was not until five years afterward, however, that Morse made the first working demonstration of his invention, which by most people was regarded as a scientific toy rather than a creation of the highest practical utility. And a scientific toy it remained until, after a heartbreaking struggle to secure the necessary financial aid, Morse persuaded Congress in 1843 to appropriate \$30,000 for the construction of a telegraph line between Washington and Baltimore. The first message to be flashed over this line, May 1, 1844, was the news



"LONG DISTANCE"

Alexander Graham Bell opening the New York-Chicago long distance telephone line, October 18, 1892.



ALEXANDER GRAHAM BELL'S SUBURBAN RESIDENCE AT WASHINGTON, D. C.



THE EDISON HOUSE AT MILAN, OHIO

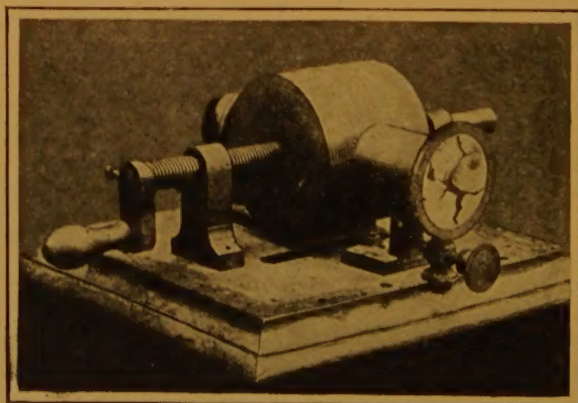
Here Thomas A. Edison was born on February 11, 1847.

which was given at the Centennial Exhibition in 1876. Connected with this invention a most interesting story is told. Bell, it is said, was experimenting with a device for multiplex telegraphy, when the accidental snapping of a wire sent a sound vibrating through another wire which had attached to it at each end a thin sheet-iron disk a few inches in circumference. At once Bell asked himself if the sound could be repeated. Experiment showed that it could, and the query then suggested itself to him, Could vocal sounds be thus transmitted? Forthwith he set himself to the task that resulted, after many failures, in the creation of the telephone.

But even in the case of this marvelous instrument it was for a long time impossible to obtain the necessary financial support. When, in 1877, Bell took the telephone to England, he could find no purchaser for half the European rights at \$10,000, and in this country a personal friend declined to advance \$2,500 for a half interest. Today, so it is stated,

of the nomination of Henry Clay for the presidency; and with the sending of that message one of the greatest inventions in the history of mankind definitely gained recognition as an accomplished fact.

Alexander Graham Bell, experimenting in the same field of long-distance communication by the aid of electricity, was more fortunate in securing early acknowledgment of the merits of his telephone, a public demonstration of



THE FIRST PHONOGRAPH

It was with this machine that Edison in 1877 originally demonstrated the fact that sound could be recorded and reproduced.

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there are in use in the United States alone approximately seven and a half million telephones.

EDISON, THE MASTER INVENTOR

Never has there been an American inventor who has contributed more abundantly than Thomas Alva Edison to the republic's industrial expansion, nor one who has achieved greatness under a heavier handicap of early disadvantages. Born (1847) of a poor family in an obscure Ohio canal village, Edison began his career at the age of twelve in the occupation of a railway newsboy.

It was as a telegrapher, which he became at eighteen, that his inventive genius first displayed itself. One after another various devices for improving telegraphic service flowed from his fertile mind, until, after his astonishing success in inventing a duplex and quadruplex telegraph, he was able to command the support of a group of New York capitalists in carrying through a long series of experiments that finally resulted in the invention of the now familiar Edison electric light.

Had it been for only this one invention Edison's name would be gratefully remembered for all time. But to strengthen his claims on the gratitude of his countrymen and of posterity there has since come from his New Jersey laboratory a succession of inventions,—to name only a few, the phonograph, the kinetoscope, the mimeograph, the storage battery, and the "talking moving pictures,"—which have meant new openings for capital, new opportunities for labor, and an incalculable enlargement of the resources of the human race. Whitney, Fulton, Howe, Morse, Bell, Edison,—clearly it is only simple historic justice to rate these great inventors with the great statesmen, warriors, and pioneers who in days gone by have won undying fame as makers of the American republic.



EDISON LISTENING TO THE PHONOGRAPH

SUPPLEMENTARY READING



Leading American Inven- tors	<i>George Iles</i>
Inventors	<i>P. G. Hubert, Jr.</i>
Four American Inventors	<i>F. M. Perry</i>
Edison—His Life and In- ventions	<i>F. L. Dyer and T. C. Martin</i>
Bell's Electric Speaking Telephone	<i>George B. Prescott</i>
Samuel Finley Breese Morse	<i>J. Trowbridge</i>
Life of Robert Fulton .	<i>T. W. Knox</i>
Memoir of Eli Whitney .	<i>D. Olmstead</i>



QUESTIONS ANSWERED

Subscribers desiring further information concerning this subject can obtain it by writing to

The Mentor Association
381 Fourth Avenue, New York City



ELI WHITNEY



MACHINE said to have paid off the debts of the South, greatly increased its capital, and trebled the value of its land, was the invention of Eli Whitney. This machine was the cotton gin. And, like many another inventor, Whitney was rewarded with ingratitude. He added hundreds of millions to the wealth of our country,

and in return had to endure humiliation and vexation of body and spirit.

Eli Whitney was born at Westborough, Massachusetts, on December 8, 1765. He early showed great mechanical ability, and by the time he was twenty-three years old had earned enough money to enable him to enter Yale. After graduating he went to Savannah, Georgia, with the hope of becoming a teacher there. He was disappointed in this; but made the acquaintance of Mrs. Nathanael Greene, widow of the Revolutionary general, and paid a visit to her plantation.

When he was there some men who were also visiting Mrs. Greene happened one day to lament the fact that there was no machine for cleaning the staple cotton of its seeds. This work had to be done by hand and was very slow. Separating one pound of the clean staple from the seed was a day's work for a negro woman.

Suddenly Mrs. Greene turned to them. "Gentlemen," she said, "apply to my friend here, Mr. Whitney. He can make anything." And she showed them several contrivances the young Northerner had made.

Whitney modestly said that he did not know how successful he would be, but that he would try. In a few weeks he produced a model, consisting of a wooden cylinder encircled by rows of slender spikes set half

an inch apart, which extended between the bars of a grid set so closely together that the seeds could not pass, but the lint was pulled through by the revolving spikes. A revolving brush cleaned the spikes, and the seed fell into another compartment. This machine could clean fifty pounds of cotton a day, as compared with one pound a day cleaned by hand.

Whitney formed a partnership with Phineas Miller, who later married Mrs. Greene, and they built a factory at New Haven to make cotton gins. This place was burned to the ground in March, 1795, and the partners were plunged into debt. Several infringements of their patent then appeared to discourage them still more, and it was not until 1807 that Whitney's rights were established.

In the meanwhile, however, the inventor became disgusted with the struggle and began manufacturing firearms for the government. This proved profitable, and he greatly improved the methods of making arms. But from the cotton gin he received little revenue.

His last years were the happiest. In 1817 he married Henrietta Edwards, the youngest daughter of Judge Pierpont Edwards of Connecticut. They had four children, a son and three daughters. Whitney died in New Haven on January 8, 1825.



ROBERT FULTON

ROBERT FULTON was not the inventor of the steam-boat. He was, however, the first man to apply the power of the steam engine to the propulsion of boats in a practical and effective manner. Born of poor parents at Little Britain, now Fulton, Lancaster County, Pennsylvania, in 1765, he received only the scantiest education;

but early showed promise of becoming an excellent artist. At the age of seventeen he took up painting seriously, and supported himself thus in Philadelphia until he was twenty-one.

Then he bought a farm in Washington County; but soon after was strongly advised to go to England for the purpose of studying art under the American, Benjamin West. There he met Earl Stanhope, Duke of Bridgewater, who interested him in engineering. In 1794 he took out an English patent for superseding canal locks by inclined planes. He also invented about this time a new method for sawing marble, a machine for spinning flax, and another for making ropes.

Soon after this he went to Paris, and built a submarine, the *Nautilus*. This boat was tried in Brest Harbor in 1801, before a commission appointed by Napoleon Bonaparte, and Fulton succeeded in blowing up a small vessel anchored there

for that purpose. Two years later, at Paris, he was also successful in propelling a boat by steam power.

Fulton returned to America, and in partnership with Robert Livingston constructed the first American steamboat, the *Clermont*. This was launched in the spring of 1807, and its success caused a great sensation. The principle of propelling boats by steam was now proved. The *Clermont* was soon established as a regular passenger boat between New York and Albany.

Fulton built the *Demologos*, or *Fulton the First*, for the United States government during the years 1814 and 1815. This was the first steam battleship ever constructed.

In February, 1815, the inventor caught cold from exposure and rapidly became worse. On February 24 he died, mourned by everyone who had known the man and his achievements.



ELIAS HOWE



It is a remarkable fact that some of the greatest and most useful inventions have been bitterly opposed by the very persons whom they were designed to help. The bowmen of olden time resented the introduction of guns; the stage coach lines tried in every way to block the building of railways; and Elias Howe, the inventor

of one of the greatest labor saving devices in the world, the sewing machine, was ridiculed, discouraged, and denounced as an enemy of poor sewing women, the ones whose toil he was seeking to lighten. They imagined that with the introduction of the sewing machine their occupation would be taken away.

Elias Howe was born at Spencer, Massachusetts, on July 9, 1819, one of a family of eight children. His father was a farmer and miller, and Elias' early years were spent in the mill. At the same time he managed to pick up a smattering of education.

He went to Lowell, Massachusetts, in 1835, to work in a cotton mill. Two years later he obtained a place in a Cambridge machine shop, in which his cousin, Nathaniel P. Banks, afterward governor of Massachusetts, was also employed.

Howe married at the age of twenty-one and moved to Boston. It was there that the first germs of his great idea became implanted in his brain. To increase the family income his wife did sewing at night. As Howe watched her slowly and laboriously stitching a seam, his inventive mind sought and sought for some way to decrease her toil. He had a natural bent for mechanics, and it was not long before he had constructed the first crude sewing machine.

This was in October, 1844. But, although he now had his idea, he lacked money to prove its value. However, a man named Fisher in Cambridge liked his invention, and agreed to board Howe and

his family and to advance \$500 in return for a half interest in the patent. By the middle of next May, Howe had constructed a machine which did sewing that promised to outlast the cloth.

But the invention was opposed everywhere in America. Finally, in 1846, Howe's brother Amasa went to England, and managed to sell the English rights in the machine for \$1,250 to a William Thomas. This man also gave Elias Howe a place in his factory at \$15 a week. But he treated the inventor shamefully, and Howe threw up the situation. He sent his family back to America ahead of him, and then returned himself. He landed in New York with less than a dollar in his pocket, and was met with the news that his wife was dying of consumption at Cambridge. He managed to borrow some money, and reached her side just before she passed away.

These were Howe's darkest days. Imitations of his machine were infringing on his patent, and he had to begin several suits to establish his rights. He and another man now began to manufacture sewing machines in a small way. It was during this time that the "sewing machine riots" took place; but soon the real value of the invention was seen, and all opposition ceased.

Brighter times began for the inventor. He won his patent suits, and by 1863 his royalties were estimated at \$4,000 a day! At the Paris Exposition of 1867 he was awarded a gold medal and the ribbon of the Legion of Honor. His last years were happy ones. He died on October 3, 1867.



SAMUEL F. B. MORSE



THE story has been told that the first words that ever came over a telegraph instrument were "What hath God Wrought!" and that they were spelled out by Samuel F. B. Morse, the inventor of the telegraphic code. This was supposed to have taken place in 1844 in Baltimore, and to have proclaimed the fact that Morse's dream of

telegraphy had become a reality. We are now told on good authority that this was not the first message to be sent by telegraph, nor was Morse the sender of the words. Instead, it was sent by one of the committee who were debating upon the proposal of Morse, the inventor, to string a telegraph line from Baltimore to Washington. Morse, who wanted to end the discussion and at the same time demonstrate his invention, strung a wire from the committee room to the top of the Capitol. One of the committee, who was opposed to President Tyler, wrote, "Tyler deserves to be hanged." This was received by the man at the other end exactly as it was composed.

Samuel Finley Breese Morse was born at Charlestown, Massachusetts, on April 27, 1791. He was the son of the Rev. Jedediah Morse, and the great-grandson of Samuel Finley, the second president of the College of New Jersey at Princeton.

Morse entered Yale at the age of fourteen, which was not considered extremely young in those days. It was there that he first began the study of electricity. But his tastes led him more strongly toward art than toward science, and in 1811 the young graduate became the pupil of Washington Allston and went with him to England. Here he remained four years, distinguishing himself with his brush and making many friends.

During the next few years the young artist traveled about New England, painting portraits for the sum of \$15 apiece. Later he increased his price to \$60 a portrait, doing an average of four a week. By the money thus earned he was enabled to marry Miss Lucretia P. Walker on October 6, 1818.

In 1825 Morse was one of the founders of the National Academy of Design, and was its first president, from 1826 until

1845. He made a second visit to Europe in 1829, and traveled about the Continent for three years before returning to New York.

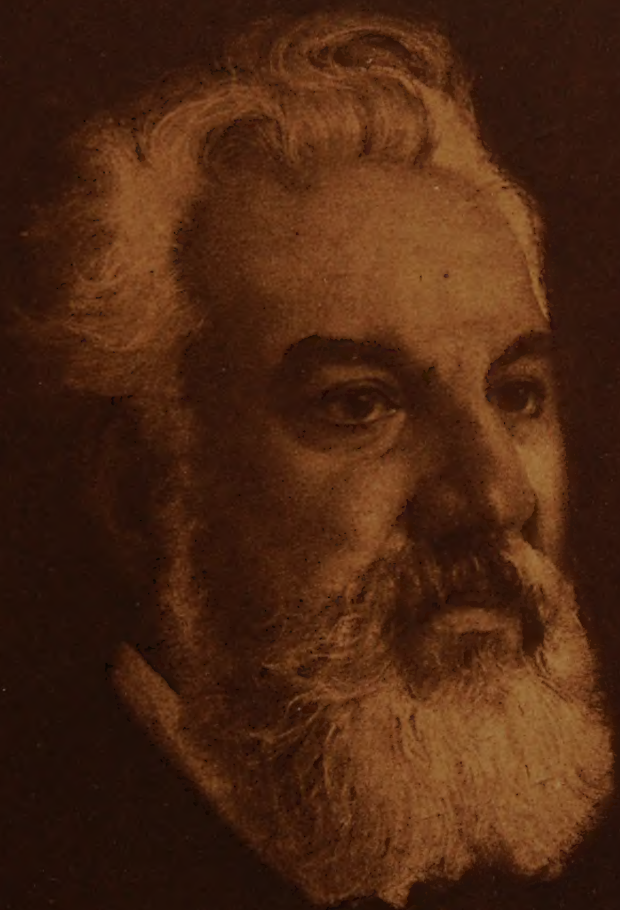
During all this time, however, while he was working at his art, Morse's mind had also been occupied with another interest. That was electromagnetism, and the possibility of communication between far distant places by means of it.

It was on board the ship *Sully*, in which he was returning to America, that he said, "If the presence of electricity can be made visible in any part of the circuit, I see no reason why intelligence may not be transmitted by electricity." And in a few days he had finished some rough plans of an apparatus to do this.

But it was a twelve years' struggle against poverty and discouragement before he could get any apparatus that would work. Finally, however, he was successful in this, and after taking out a patent applied to Congress for money to experiment with the telegraph over a circuit of sufficient length to test its possibility and value. After long delay he was at last granted this in 1843. A line was built from Baltimore to Washington, and on May 24, 1844, Miss Ellsworth, daughter of the Commissioner of Patents, sent the first message from the chamber of the Supreme Court in Washington to Baltimore.

Three years later Morse was compelled to defend his invention in the courts, and successfully proved his claim to be called the inventor of the electro-magnetic recording telegraph. He married for the second time in 1848.

In 1871 a bronze statue of Morse was erected in Central Park, New York City, and the following year, on April 2, the great inventor died, simple, dignified, and kindly to the end.



ALEXANDER GRAHAM BELL

GREAT AMERICAN INVENTORS

Alexander Graham Bell

FIVE

ONE hot afternoon in June, about forty years ago, a young man was standing in a grimy workshop by the side of a crude little machine composed of a clock spring reed, a magnet, and a wire. He was bending over this queer machine listening intently. Suddenly he bent nearer, a startled look of excitement upon his face.

From the clock spring had come a faint, almost inaudible sound. The young man straightened up and ran into an adjoining room, where another man stood near a second instrument similar to the first.

"Snap that reed again!" he cried excitedly.

The assistant obeyed him, and again came that faint twang from the spring in the front room. The telephone was born!

And the man who accomplished this wonder was a poor young professor of elocution in Boston, Alexander Graham Bell. He was not an American by birth. He was born in Edinburgh, Scotland, on March 1, 1847. His father was Alexander Melville Bell, the inventor of a system by which the deaf can read speech by observing the motion of the lips.

The Bell family moved to Canada in 1870, and Alexander, the younger, took up teaching the deaf and dumb in Boston. He became instructor of phonetics, or the science of articulate sound, in Monroe's School of Oratory. He was a hard worker, but poor. One time when he had rheumatism his employer had to pay his hospital expenses.

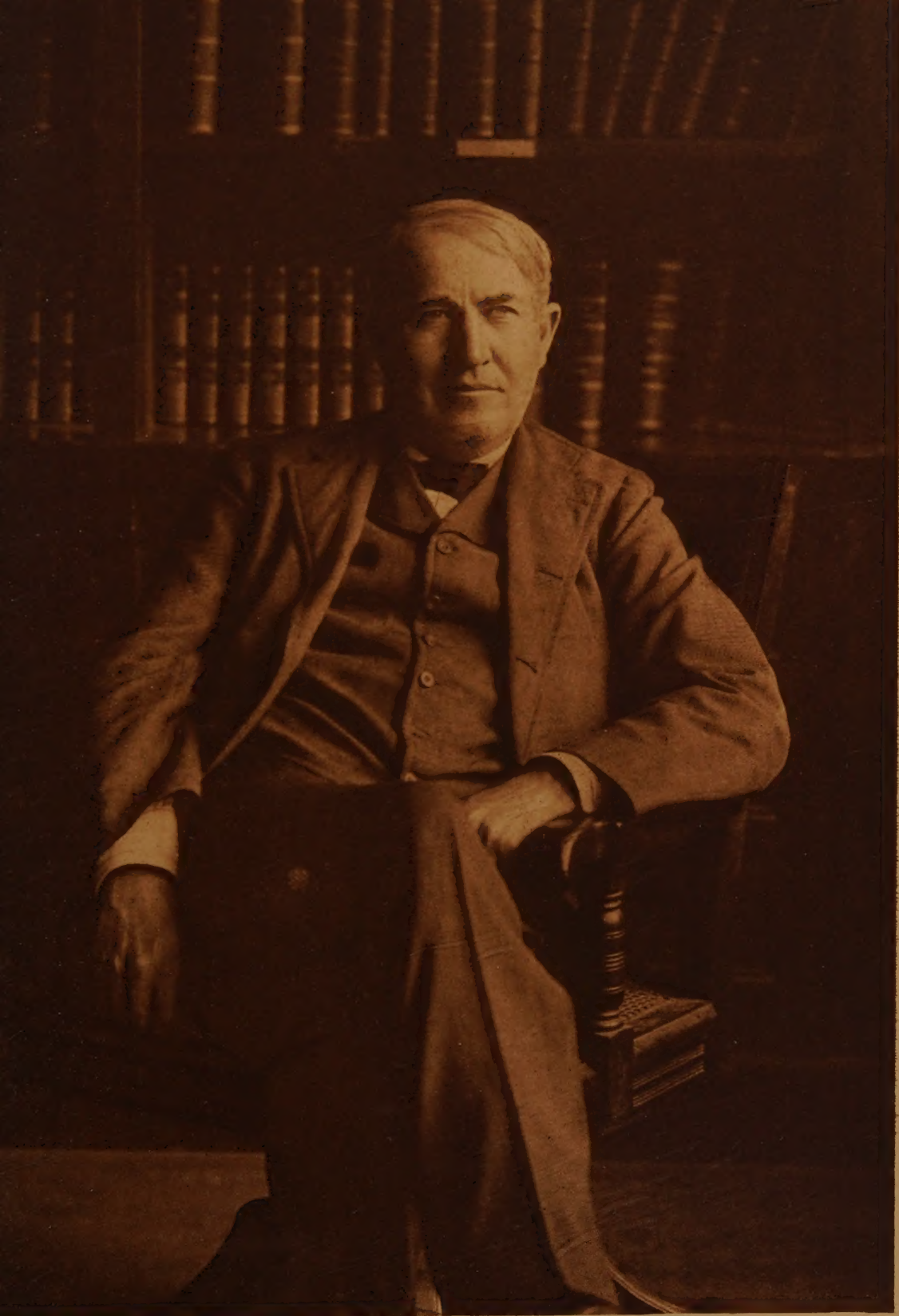
It was about this time that Bell began experimenting with the transmission of sound by electricity. For a number of

years other people had been trying to do this. Sir Charles Wheatstone in England had discovered that wires charged with electricity often carried noises in a curious way. In 1869 Reis, a German professor, constructed an instrument that sent a series of clicks along an electric wire to an electromagnetic receiver at the other end. And others were turning their attention to this interesting phase of telegraphy.

But it was Alexander Graham Bell who first succeeded in grasping the correct idea. A few months after the incident described above, on a day in January, 1876, he called some of his pupils into a room and showed them an instrument that transmitted singing from the cellar of the building to where they were on the fourth floor.

People were at first slow to appreciate the importance of this great invention; but gradually they came to see its value, and today there are over seven million telephones in use in the United States alone.

Money and honors have poured in upon the inventor, who still lives to enjoy his triumph. His income is said to be more than \$1,000,000 a year. In 1880 the French government awarded him the Volta prize of \$10,000, and two years later he received from the same country the ribbon of the Legion of Honor.



THOMAS A. EDISON

THE scene—the Boston office of a great telegraph company. The time—a half century ago. Enter a tall young man wearing a slouchy, broad-brimmed hat and a wet duster clinging to his legs, who marches into the superintendent's office, and says: "Here I am." The superintendent gazes at him. "Who are you?" he finally asks.

"Tom Edison."

"And who on earth might Tom Edison be?"

The young man explains that he has been ordered to report for duty at the Boston office. He is told to sit down and wait. A little while later a New York sender, who is one of the most rapid in the telegraph business at the time, calls up. All the operators are busy.

"Let that new fellow try him," says the chief.

Edison sits down and for four and one-half hours takes the speedy messages. The faster the instrument clicks, the faster he writes the words. At the end New York calls:

"Hello!"

"Hello yourself!" Edison flashes back.

"Who the dickens are you?" asks the New York operator.

"Tom Edison."

"You are the first man in the country, that could ever take me at my fastest," clicks out New York, "and the only one who could ever sit at the other end of my wire for more than two hours and a half. I'm proud to know you."

This little story of Thomas Alva Edison shows that even as a young man he exhibited unusual ability. He was born on February 11, 1847, at Milan, Erie County, Ohio. His family moved to Port Huron, Michigan, when the boy was seven, and when he was only twelve years old Edison became a train newsboy on the railway to Detroit. It was during this time that he rigged up apparatus in the baggage car

and experimented with chemistry and telegraphy.

He was but fifteen when he became a telegraph operator. But his studies and experiments interfered so much with his duties that he was discharged many times. He worked in a number of cities of the United States and Canada. At the age of twenty-one he had built an automatic repeater, by which a telegraphic message could be transferred from one wire to another without the aid of an operator. By means of this messages could be sent direct to a much greater distance than formerly.

Edison finally went to Boston, as related herein, and thence to New York, in 1869. There he invented an improved printing telegraph for stock quotations, the ticker. For this he received \$40,000.

Then he built a laboratory at Newark, New Jersey; but four years later moved to Menlo Park, and later to West Orange, New Jersey. All the time he continued his experiments and inventions. He lives now at Orange, and is as hard a worker as he was when a young man.

Among Edison's more important inventions are his system of multiplex telegraphy; the carbon telephone transmitter; the phonograph; the incandescent lamp and light system; the kinetoscope; and the talking-moving-picture. In all he has had seven hundred patents granted to him.

In 1878 Edison was made Chevalier and afterward Commander of the Legion of Honor by the French government.